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Tuberculosis of the Tongue.—A patient with advanced pulmonary tuberculosis developed a proved tuberculous ulcer of his tongue subsequent to a trauma. Following treatment with streptomycin the ulcer healed completely while the pulmonary condition did not improve.—*Treatment of Tuberculous Ulcer of the Tongue with Streptomycin, H. Wolfer, I. Hirshleifer & R. Shapiro, J. A. M. A., January 24, 1948, 136: 249.*—(*H. Abeles*)

Tuberculous Cervical Adenitis.—The treatment of tuberculous cervical adenitis has gone through a number of phases. Extensive surgical extirpation fell into disrepute and was replaced by nonsurgical measures such as heliotherapy and roentgen therapy. The former treatment is lengthy and unavailable to most patients. The latter, while efficacious, leaves unsightly scars. Aspiration of abscesses resulting from extension of the tuberculous process is to be condemned. Incision followed by curettage also is disapproved; the results are very poor and occasionally disseminated tuberculosis results. The author proposes a revival of surgical treatment. Good anesthesia is desirable in order to avoid overdistension of the neck veins. The surgeon should be trained in dissection of the neck. Diseased tonsils and adenoids should be removed. Complete local dissection of the involved group of nodes should be carried out. Where abscess formation has resulted, and the skin is involved, the unhealthy portion is excised and the wound is packed with vaseline gauze. Provision should be made for a convalescence of two to three months.—*Tuberculous Cervical Adenitis, H. Bailey, Lancet, February 28, 1948, 1: 313.*—(*A. G. Cohen*)

Tuberculosis of the Pancreas.—In Argentina, 7 cases of this very rare localization of tuberculosis have been published. Another case is added by the authors. An 18-year-old girl was treated over a period of one year for intestinal tuberculosis. The autopsy showed hematogenous tuberculosis of most of the intestinal organs. The pancreas was surrounded by a voluminous conglomeration of caseous glands. The organ itself was studded with numerous seed-like nodules, especially in the head. Histologically, there was massive central necrosis of the lobules with thrombosis of the central arteriole. In the periphery of the lobule the necrosis was less intense. Numerous lymphocytes and some fibroblasts and histiocytes were found in this area. The necrosis was contained by the interlobular wall. Occasional acid-fast bacilli were found.—*Tuberculosis hematogena del pancreas, F. Gonzalez, R. I. Latienda & E. Erbelli, Arch. argent. de tisiol., 1946, 22: 37.*—(*W. Swienty*)

Genital Tuberculosis.—Latent genital tuberculosis in females is more common than heretofore suspected. Endometrial biopsies are of value only if the tuberculous process reaches the endometrium. The author performed cultures for tubercle bacilli on 140 specimens of menstrual fluid from 80 women including 10 with known endometrial tuberculosis and 2 suspects. Nine positive cultures were obtained from 6 different women, in-

cluding 2 who had positive biopsies. Cultures in 19 others revealed nonpathogenic acid-fast bacilli.—*Detection of Latent Genital Tuberculosis by Culture of Menstrual Discharge, I. Halbrecht, Lancet, December 27, 1947, 2: 947.*—(*A. G. Cohen*)

Tuberculous Lupus Treated with Vitamin D2.—The author reports marked improvement in the clinical condition of a 36-year-old patient suffering from tuberculous lupus and from arthritis, following treatment with vitamin D2 for a period of about twelve weeks. The dosage was 240,000 units (6 mg.) of an alcoholic solution given daily by the oral route during the first month, and 120,000 units (3 mg.) daily during the following months. The treatment given varied somewhat from that recommended by Charpy (600,000 units three times for one week, twice a week for one week and once a week for three weeks). In spite of the larger doses given, no signs of intolerance were manifest. During the first weeks, blood calcium and urinary calcium increased. In the later months there was spontaneous reduction of calcium excretion. Tuberculous arthritis in the right knee showed definite improvement during the treatment. The patient had had lupus of the right cheek for twenty years. Biopsy of tissue at the periphery of the lesion showed Langhans' giant cells and epithelioid cells surrounded by a lymphocytic infiltrate. The right knee, which was the seat of subacute inflammation and hydrarthrosis, was swollen and tender. Culture of aspirated cloudy fluid, 35 cc. in amount, resulted in the growth of tubercle bacilli. A patch tuberculin test at the beginning of treatment gave a four-plus reaction, at its close only a two-plus reaction. A second aspiration of the knee at about the same time yielded barely 7 cc. of blood-stained fluid. Cultures and animal inoculation of portions of this were negative after four weeks. In conclusion, the author believes the administration of unusually large doses of vitamin D2 was of great benefit to his patient. However, he warns physicians that patients receiving such doses should be under the strictest medical supervision. Clinical signs of toxic effect, or of important modifications of blood calcium or urea would be indications for temporary or complete abandonment of the treatment.—*Considerations sur le traitement du lupus tuberculeux par la vitamine D2, J. Grandbois, Laval med. (Quebec), September, 1947, 12: 829.*—(*A. T. Laird*)

Treatment of Tuberculous Cystitis.—In 4 patients who had undergone nephrectomy for renal tuberculosis, there was a persistent cystitis. Treatment consisted of transplanting the remaining ureter into the pelvic colon. Good symptomatic results were obtained in all cases.—*Tuberculous Cystitis: Transplantation of Remaining Ureter, F. C. Pybus & D. T. Jones, Lancet, February 21, 1948, 1: 280.*—(*A. G. Cohen*)

Tuberculous Cystitis.—Three cases are reported. The first was characterized by "the golf hole ureter"—the gaping hole in the bladder wall produced by tuberculous involvement of the ureter. Nephrectomy established the diagnosis of tuberculous pyonephrosis and ureteritis. The second case had bilateral gaping ureteral orifices, produced not by ureteral traction but by "increased intravesical pressure and incompetence of the valve mechanism." The third case, at cystoscopy, revealed mucosal ulceration around a golf hole ureteral orifice. Intravenous pyelogram indicated a filling defect in the bladder, around the right ureteral orifice. Although a filling defect is usually caused by neoplasm, the diagnosis here was ulcerating tuberculosis pyelonephritis, ureteritis and cystitis.—*Tuberculous Cystitis: Notes on Three Cases, A. S. Johnstone, Brit. J. Radiol., February, 1947, 20: 61.*—(*L. Hyde*)

Tomography of the Spine.—Tuberculosis of the spine is first noticeable in the X-ray film as a diminution of the space between the vertebral bodies, with decalcification of the adjacent portions of bone. As caries pro-

gresses some collapse occurs, and several vertebral bodies may be involved. Ordinary anteroposterior and lateral X-rays are useful in determining the extent and progress of the disease. Tomography is of special value, however, in overcoming difficulty in such areas as the first and second cervical vertebrae, the cervical-dorsal region, and the lumbosacral area, where overlapping structures may interfere in delineation of bony disease. In the region of the first and second cervical vertebrae, a good view of the diseased area may be obtained from an ordinary lateral film, but in the anteroposterior X-ray film the area is usually obscured by the lower jaw. In the cervical dorsal region, tuberculous disease may be delineated with plain films, but tomography may be very helpful in more accurate definition. Tuberculous disease of the sacrum is rare except in conjunction with disease of the sacroiliac joints. Tomograms may be of value in special cases. A brief description of the radiographic technique is given.—*Tomography of the Spine in Tuberculous Disease, S. G. Wood & M. C. Wilkinson, Brit. J. Radiol., October, 1947, 20: 418.*—(*L. Hyde*)

Addison's Disease.—The author describes and analyzes the incidence, with age and sex distribution, and the findings in 38 cases of Addison's disease—17 males and 21 females—diagnosed from 1921 to 1945 in several hospitals in Helsinki, Finland. In 14 cases a tuberculous etiology could be established; 8 of those were confirmed by autopsy, revealing adrenal tuberculosis, while 6 had a history or signs of tuberculosis in organs other than the adrenals. In two cases the X-ray finding of calcified lesions in the adrenal area indicated the tuberculous etiology. Other causes of the syndrome were atrophy, sclerosis or injury of the adrenal gland, metastatic carcinoma and endocarditis lenta. More than 50 per cent died within two years from the onset of the symptoms; the longest duration was ten years. The most recent cases were treated with a low potassium diet, sodium chloride, vitamin C and Cortiron injections.—*Clinical Findings in Addison's Disease, O. Helve, Act. Med. Scand., June, 1947, 128: 289.*—(*O. Pinner*)

Congenital Tuberculosis.—In a previous communication, the authors reported the case of a 17-day-old infant who died of tuberculosis which was thought to have resulted from aspiration of infected amniotic fluid. The mother showed no signs of clinical tuberculosis, but the Mantoux was positive. Nine months later, she developed tuberculosis of one eye and then progressive pulmonary tuberculosis from which she eventually died. There was no autopsy. Thus, in her case, placental involvement was the first clinical manifestation of hematogenous tuberculosis.—*Aspiration Type of Congenital Tuberculosis: Further Communication, W. Pagel & S. Hall, Tubercle, February, 1948, 29: 32.*—(*A. G. Cohen*)

Erythema Nodosum and Tuberculosis.—The relationship between erythema nodosum and tuberculosis is an unsettled question. Geographical factors are important. Erythema nodosum sometimes is found in lymphogranuloma venereum, sarcoidosis, pneumonia, syphilis and staphylococcus infections. It is evident that under European conditions the principal causes are tuberculosis and hemolytic streptococcus infections. The relative importance of the two factors varies from one country to another. Recent work in Sweden on 178 cases of erythema nodosum in adults showed only 58.4 per cent to be tuberculous, while at least 16.9 per cent were due to hemolytic streptococcus and the remainder to unknown factors. The author analyzes his own material in Norway from 1937 to 1947. In these cases, 50.5 per cent occurred between the ages of 16 and 30. He wonders if there is not a predisposition in this particular age group. The tendency to appear in certain families is noted. All patients were examined by the Pirquet test; if this was negative, a Mantoux was done. By this means, 86.5 per cent were found positive to the Pirquet, with an additional 2.5 per cent positive to Mantoux. A conversion of tuberculin test

from negative to positive was found in 29 per cent. Tubercle bacilli were found in gastric contents in 57 cases; with an additional case of primary tuberculosis of the urogenital tract, there was a total of 58 cases or 29 per cent with proved primary tuberculous infection. In addition, primary tuberculosis is highly probable (*1*) when tuberculin conversion (less than two years between last negative and first positive) is found, together with a roentgenogram characteristic of primary tuberculosis, (*2*) when a vesicular Pirquet reaction is combined with a characteristic roentgenogram, and (*3*) when a vesicular Pirquet reaction is found in children under 5 years of age. These criteria were fulfilled in 52 cases (26 per cent). Thus, there were 55 per cent in which tuberculosis was certain or highly probable. Primary tuberculous infection also is probable in cases showing coversion of tuberculin reaction but with a negative roentgenogram. This was found in 18 cases (9 per cent), making a total of 64 per cent in which tuberculosis may be considered certain or probable. In 12 cases (6 per cent), there was weighty clinical and/or bacteriological or serological evidence of streptococcus infection. In 4 of these, sulpha drugs seem to have been the cause. On 7 occasions, erythema nodosum appeared during pneumonia, on 5 occasions during rheumatic fever and 6 times during nontuberculous hilar adenitis. Thus, there was positive evidence of nontuberculous etiology in 15 per cent. Of the remaining 38 cases, tuberculosis could be definitely excluded in 22. Thus, in 52 cases (26 per cent) there was overwhelming evidence of a nontuberculous etiology. The author concludes that not more than two-thirds of cases of erythema nodosum are due to tuberculosis. Still, every tuberculin-positive case with erythema nodosum must be treated for tuberculosis unless a thorough examination can rule this out. The best guide to an etiological diagnosis seems to be a vesicular Pirquet reaction. Affections of the eye were found in 5.5 per cent. The importance of episcleritis in the diagnosos of tuberculosis is stressed. Of 44 electrocardiograms, 41 were normal.—*Further Investigations Concerning the Relation between Erythema Nodosum and Tuberculosis, H. J. Ustvedt, Tubercle, December, 1947, 28: 247.*—(*A. G. Cohen*)

Examination of Sputum for Tubercle Bacilli.—Gastric lavage is an inconvenient method for obtaining material for bacteriologic examination. In 1941, the laryngeal swab method was introduced. The report is a comparative study of the two methods. The patients were all known tuberculous cases who had become sputum free or had scanty sputum which was negative by smear and culture. In 58 patients, a laryngeal swab was made on three successive days, while gastric lavage was done on the second day. In 115 patients, only one of each was done, while 20 patients had one gastric lavage and two swabs. All the material was cultured by methods which are described in detail. No direct smears were made. Better results were obtained with the gastric lavage than with only one swab; where there were three swabs, the results were better than with gastric lavage. However, if three tubes were inoculated with the same gastric washings, better results were obtained than from three laryngeal swabs. The swab is preferable because it is less unpleasant for the patient, creates less work for the nurse and is easier for the laboratory to handle.—*Examination for Tubercle Bacilli by Gastric Lavage and by Laryngeal Swab: A Comparative Study, H. G. Hounslow & G. Usher, Tubercle, February, 1948, 29: 27.*—(*A. G. Cohen*)

Dubos' Medium for culture of M. tuberculosis.—The use of a mild reagent (2.5 per cent solution of ammonium carbonate) for homogenization and concentration of tuberculous sputa and the addition of penicillin (0.05 to 2 units per ml.) to the culture medium permitted the successful application of Dubos' medium to the routine culture of *M. tuberculosis* from sputum. Of 400 examined sputa, 34 (8.5 per cent) were positive by culture method and negative by microscopic examination. The use of Dubos' medium offers the advantage of a rapid (within eight to fifteen days) culture diagnosis of sputa containing relatively small

numbers of tubercle bacilli.—*Use of Dubos' Medium for Culture of M. tuberculosis from Sputum, H. Goldie, Proc. Soc. Exper. Biol. & Med., June, 1947, 65: 210.*—(*F. B. Seibert*)

Gastric Acidity in Tuberculosis.—The gastric acidity curve of man is governed by large endogenous-rhythmical variations. In some individuals the curve rises during the day, while in others it falls from a morning high to anacidity in the late afternoon, persisting through the night. In infectious diseases, especially tuberculosis, serious disturbances of the rhythm may occur. At first irritation with increased amplitude of the curve (heteroacidity) prevails, in the toxic phase paralysis gradually develops and there is an abrupt fall after meals, and finally there eventuates complete achlorhydria. Of 557 tuberculous patients only 191 showed homacidity, i. e., acidity figures within the same range after each of the three Ewald test meals taken at 8:00 A.M., 1:00 and 6:00 P.M., in some cases also at midnight and 4:00 A.M. In the remaining group with heteroacidity, the rising and sinking tendencies were about equal in incidence and degree. Patients with partial achylia frequently have more or less normal acidity in the morning but marked impairment of the gastric function later in the day. A single morning test would therefore not reveal actually existing conditions. At least two tests should be carried out, one on a fasting stomach and the other after a meal. If only a single test can be performed it should be done at the time of the principal meal, but even this may occasionally be misleading. In estimating the degree of gastric acidity also the duration must be taken into account.—*To What Degree Does Gastric Acidity Show a Tendency to Rise or Fall During the Day? E. Forsgren, Act. Med. Scand., June, 1947, 128: 281.*—(*O. Pinner*)

Streptomycin and Benzoic Acid Metabolism.—The effect of streptomycin on the accelerating action of benzoic acid on the metabolism of pathogenic and nonpathogenic mycobacteria was studied. The results show that the oxidation of benzoic acid by nonpathogenic mycobacteria may be inhibited by small amounts of streptomycin. Benzoic and salicylic acids stimulate the oxygen uptake of pathogenic mycobacteria but are not oxidized by them. This reaction is not inhibited by streptomycin. Since the growth of these pathogenic mycobacteria is equally well inhibited by the drug it would seem therefore that there must be some general reaction which is inhibited in these organisms by streptomycin and that the inhibition of oxidation reactions is secondary. There appears to be a parallelism between the ability of some of the mycobacteria to grow in the presence of streptomycin and their ability to oxidize benzoic acid in its presence. Resistance appears to be accompanied by the production of more of the catalyst or catalysts responsible for the oxidation of benzoic acid. Streptamine and streptidine which do not inhibit growth do not inhibit the oxidation of benzoic acid.—*The Effect of Streptomycin on the Metabolism of Benzoic Acid by Certain Mycobacteria, R. J. Fitzgerald & F. Bernheim, J. Bact., December, 1947, 54: 671.*—(*F. G. Petrik*)

Licheniformin, an Antibiotic.—The author prepared an antibiotic substance from cultures of *Bacillus licheniformis* which were grown on lactate-asparagine medium for four days at 38° C. An antibiotic substance (licheniformin) was extracted from the culture medium by absorption on carbon, elution, and conversion into the picrate and hydrochloride. Licheniformin is a base of which the hydrochloride is an amorphous material. It is very soluble in water, and when in solution it is fairly stable to heat-treatment. The hydrochloride has the approximate composition C.40; H. 7.5; N 17.4; C 1.9. per cent. Chemical and biological properties of licheniformin distinguish it from other antibiotics derived from the *B. subtilis* group. Licheniformin has bacteriostatic activity against corynebacteria, staphylococci, streptococci, pasteurellae, brucellae, mycobacteria, and *B. anthracis;* the growth of strains of *M. tuberculosis* tested is inhibited by concentrations of $1:1.6 \times 10^5$ to

1:6.4 × 10^4. Activity *in vitro* decreases with increasing size of the inoculum and with increasing acidity of the medium; it is little affected by the presence of serum. Licheniformin is moderately toxic for mice, high dosages causing death and repeated smaller doses causing damage to the kidneys.—*Licheniformin, an Antibiotic Substance from Bacillus Licheniformis, Active against Mycobacterium Tuberculosis, R. K. Callow, R. E. Glover, P. Darcy Hart & G. M. Mills, Brit. J. Exper. Path., December, 1947, 28: 418.—(H. J. Henderson)*

Antibiotic Activity of Actinomycetes.—This paper reports three agar plate methods (the cross-streak, the cylinder plate and the streak plate) and the various media which have been used to select actinomycetes with antibiotic properties, and to test filtrates and concentrates derived from these. The streak plate method with virulent human tubercle bacillus (H37Rv) is useful as a relatively rapid procedure for screening cultures in the search for new antibiotics. If a streptomycin-resistant strain of H37Rv is also streaked on the plate, antibiotics bearing a relationship to Streptomyces griseus may be detected. A smooth opaque layer of growth may be obtained by seeding pour plates with H37Rv. Filtrates and concentrates in cups will give inhibition zones, though quantitative measurements are difficult to make because the zones are not always sharply defined. Pour plates, seeded with tubercle bacilli and streaked with actinomycetes, are useful in the search for cultures with tuberculostatic properties. The plates may be seeded with H37Rv or with H37RvR (resistant to streptomycin) and cross-streaked with various strains of actinomycetes. The avirulent, rapidly growing strain 607 is not suitable for this purpose, since some strains of actinomycetes which inhibit the virulent H37Rv strain do not inhibit, under the same conditions, strain 607.—*Plate Methods for Testing Antibiotic Activity of Actinomycetes against Virulent Human Type Tubercle Bacilli, E. H. Williston, P. Zia-Walrath & G. P. Youmans, J. Bact., November, 1947, 54: 568.—(F. G. Petrik)*

Promin in Experimental Tuberculosis.—Eight groups of guinea pigs, consisting of 12 animals each, were utilized. Each animal was inoculated with 0.1 mg. of the human type of tubercle bacilli (H37Rv). Twenty-six days later, treatment of seven of the groups was started; the eighth group remained untreated for control. One group received promin orally, five groups received variable doses of promin subcutaneously and one group received streptomycin. Treatment was continued for seventy-six days and the experiment was terminated 102 days after the animals had been inoculated with the bacilli. Results indicated that promin given subcutaneously to tuberculous guinea pigs is fully as effective in its antituberculosis action as the same dose of promin given orally. The parenteral administration of promin did not, in guinea pigs, preclude the development of blood dyscrasia.—*Promin in Experimental Tuberculosis: Antituberculosis Effects of Sodium P,P'-Diaminodiphenylsulfone-N,N'-didextrose Sulfonate (Promin) Administered Subcutaneously (A Preliminary Report), W. H. Feldman, A. G. Karlson & H. C. Hinshaw, Proc. Staff Meet., Mayo Clin., March 3, 1948, 23: 118.—(P. Q. Edwards)*

Effect of Penicillin on Tubercle Bacillus.—A virulent strain of tubercle bacillus, H37Rv, undergoes partial lysis in the presence of high concentrations of penicillin. Small inocula of tubercle bacilli are highly susceptible to concentrations of penicillin as low as 1 unit per cc. in the Tween-albumin medium, whereas 100 units per cc. causes no inhibition of growth in the oleic acid albumin medium. Preliminary experiments indicate that, in both the solid and liquid oleic acid albumin medium, penicillin in concentrations of 50 to 100 units per cc. may prove a valuable adjunct in culturing tubercle bacilli from contaminated materials.—*Effect of Penicillin on the Tubercle Bacillus in vitro, W. M. M. Kirby & R. J. Dubos, Proc. Soc. Exper. Biol. & Med., October, 1947, 66: 120.—(F. B. Seibert)*

Enhancement of Penicillin Blood Levels.—This report illustrates the capacity of orally administered caronamide ("Staticin"—Sharp and Dohme, Inc.) to effectively increase penicillin blood levels in a group of patients where excessively high levels are essential for cure, i.e., subacute bacterial endocarditis. It has been shown that the excretion of penicillin by the renal tubular transport mechanism could be physiologically inhibited by caronamide. It is thought that the basis for this effect is one of competition between penicillin, which is excreted by the tubules, and caronamide, which is essentially refractory to excretion by that means. Caronamide was given orally in 2 or 3 gm. doses every four hours and the penicillin was administered intravenously with heparin. Accepting the dosage of 3 gm. every four hours as standard, the minimum increase over control blood levels was twofold and the maximum increase was sevenfold. No side effects of any consequence were noted.—*Enhancement of Penicillin Blood Levels following Oral Administration of Caronamide, L. Loewe, H. B. Eiber, E. Altur-Werber, Science, November 21, 1947, 106: 494.*—(*E. A. Rouff*)

Coupled Sulphanilamide Derivatives.—The sulphonamides examined were sulphanilamide, sulphapyridine, sulphathiazole, and sulphamethylthiazole. They were coupled to 2-methyl-1,4 napthoquinone. These were dissolved in various concentrations in Löwenstein medium. Human tubercle bacilli strain No. 1354 in suspensions of 0.05 ml. containing 30 to 60 bacilli were employed for inoculation. Tubes were incubated at 37° C. All four sulphanilamides have a bacteriostatic effect; sulphathiazole and sulphamethylthiazole were most effective. The coupled compounds were the less effective. After serial subculturing it was shown that the sensitivity to the respective drugs was not changed. In the presence of sulphathiazolemethyl-naphthoquinone, the bacilli became longer and broader, were more diphtheroid, were colored more intensively, and contained greater amounts of nonacid-fast material. Under the electron microscope, it was seen that the bacilli were less dense and characterised by clubbed ends and smaller granules. They were much broader, and the central denser part was surrounded by a wide, capsule-like external zone. These changes appeared to be of an involutionary nature. These experiments seem to support the conception that the compounds of methyl-naphthoquinone play a special role in the development of the morphological changes.—*The Effect on Tubercle Bacilli of Sulphanilamide Derivatives Coupled to Methyl-Naphthoquinone, A. Grönwall & B. Zetterberg, Upsala läkaref. förh., June 30, 1947, p. 199.*—(*R. W. Clarke*)

Para-Aminosalicyclic Acid in Tuberculosis.—Of a series of benzoic and salicyclic acid derivatives, para-aminosalicylic acid was found to have the most active bacteriostatic action on tubercle bacilli. It is relatively nontoxic to animals. The optimum dosage for humans is thought to be 80 to 140 gm. per week, given orally. A total of 19 cases of tuberculosis were treated. All had pulmonary involvement, but only 6 were treated for those lesions *per se*. In the pulmonary series, all of which were active cases, the temperature and sedimentation rate fell within a few days. This improvement was maintained unless treatment was stopped. More slowly, there appeared a fall in pulse rate, an increase in weight and a decrease in the amount of sputum. There was roentgenographic improvement, particularly noteworthy being a decrease in the size of cavities. In one case of renal tuberculosis, no tubercle bacilli could be found in the urine after the twelfth day; by the eleventh week, the urine was free of albumen, pus and blood. In one case of tuberculous meningitis, oral medication was supplemented by 2 intrathecal injections each of 0.5 gm. of the drug in 5 per cent solution. The meningitic symptoms improved but the patient died of pulmonary tuberculosis. In one case of intestinal tuberculosis, there was symptomatic improvement. In one case treated by Monaldi drainage, introduction of the drug into the cavity resulted in diminution of the amount of discharge. In 9 cases of tuberculous empyema, including 3 with ex-

ternal sinuses, the oral medication was supplemented by weekly intrapleural administration of 1.5 to 3.0 gm. of the drug as a 10 per cent solution in distilled water. This treatment gave rapid and striking results.—*Para-Aminosalicylic Acid in Tuberculosis, T. G. Dempsey & M. H. Logg, Lancet, December 13, 1947, 2: 871.*—(*A. G. Cohen*)

Tuberculostatic Action of Para-Aminosalicylic Acid.—Lehman found that PAS was bacteriostatic in a concentration of 0.15 mg. per 100 ml. for BCG, that it exerted a favorable effect on clinical tuberculosis and that some retardation of experimental tuberculosis of guinea pigs could be effected after seven days of treatment with PAS. Youmans reported that PAS was highly bacteriostatic for 12 virulent strains of human type tubercle bacilli and exerted a suppressive action on experimental tuberculosis in mice. The present paper deals with further work on the tuberculostatic activity of p-aminosalicylic acid both *in vitro* and *in vivo*. This was tested *in vitro* by determining the least amount which would completely inhibit the subsurface growth of 0.01 mg. of tubercle bacilli per ml. of synthetic medium with and without 10 per cent bovine serum. The human type strains had been isolated within the preceding year and a half, with the exception of the standard H37Rv strain. In addition one stock bovine and one avian strain, as well as the avirulent rapidly growing strain no. 607, were used. Six of the human type strains were streptomycin-resistant. The effect of PAS *in vivo* was determined by infecting mice intravenously with 0.1 mg. of the H37Rv strain. PAS was incorporated in the desired concentration in the mouse diet. The mice were fed the diets containing PAS for twenty-eight days, starting the day before infection with tubercle bacilli. The results show that all of the strains except no. 607 were inhibited by very low concentrations of PAS. There was no significant difference between the results obtained with the streptomycin-sensitive and resistant strains. The avian strain seemed to be slightly more resistant to the bacteriostatic activity of PAS. The bacteriostatic activity was partially reversed by para-aminobenzoic acid but was not reversed by sodium salicylate. The bacteriostatic activity of PAS was inversely proportional to the number of organisms present in the medium. Thirteen derivatives of PAS and salicylic acid were found to be much less tuberculostatic than PAS. Experimental tuberculosis of mice was suppressed by para-aminosalicylic acid when it was administered in the diet in 1 and 2 per cent concentrations. Under the conditions of the experiment 4 per cent PAS was highly toxic for mice. PAS and streptomycin when administered to mice simultaneously appeared to exert a suppressive effect on the tuberculous process greater than that of either substance alone. As the effect appears to be no more than additive, the implications in the treatment of clinical tuberculosis are obvious.—*The Tuberculostatic Action of Para-Aminosalicylic Acid, G. P. Youmans, G. W. Raleigh & A. S. Youmans, J. Bact., October, 1947, 54: 409.*—(*F. G. Petrik*)

Tuberculostatic Action of Alicyclic Compound Derivatives.—The 3-n-amylcyclopentane-carboxylic acid mono-ester of sodium β-glycerophosphate was found to be half as effective as the 3-n-amylcyclopentane-carboxylic acid di-ester of sodium β-glycerophosphate in causing inhibition of growth of the tubercle bacillus (Strain A 27) *in vitro*, as well as in its tuberculostatic effect on the chorio-allantoic membrane of the chick embryo. Both substances were similar to the parent substance, sodium 3-n-amyl-cyclopentane-carboxylate, in their toxicity for the chick embryo. In white mice, all 3 compounds had a narcotic effect and produced hemorrhages at the site of injection.—*Tuberculostatic Action of Two Derivatives of the Alicyclic Compound, 3-n-Amyl Cyclopentane-Carboxylic Acid, E. W. Emmart, Proc. Soc., Exper. Biol. & Med., June, 1947, 65: 156.*—(*F. B. Seibert*)

Chemotherapy of Experimental Tuberculosis.—A new class of highly tuberculostatic agents of low toxicity is described. This group comprises many 2,6-substituted derivatives of benzothiazole. Several of these

derivatives are active therapeutic agents in guinea pig tuberculosis. Structure-activity relations and possible modes of action are discussed.—*Chemotherapy of Experimental Tuberculosis with Benzothiazole Derivatives, B. L. Freedlander & F. A. French, Proc. Soc. Exper. Biol. & Med., November, 1947, 66: 362.* —*(F. B. Seibert)*

Chemotherapy in Tuberculosis.—Using the medium of Dubos and Davis, 19 compounds were tested *in vitro*. Only 4 showed sufficient activity to warrant further investigation. Compound 2-butoxy-5-amino-pyridine sodium formaldehyde bisulfite was found to be ineffective in the treatment of experimental tuberculosis in mice and guinea pigs.—*Chemotherapy of Tuberculosis: III. In vitro and in vivo Activities of Various Compounds, C. J. Duca, R. D. Williams, & J. V. Scudi, Proc. Soc. Exper. Biol. & Med., February, 1948, 67; 159.*—*(F. B. Seibert)*